Code No: 135AK **R16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year I Semester Examinations, January/February - 2023

DIGITAL COMMUNICATIONS

(Common to ECE, ETM)

Time: 3 Hours **Max. Marks: 75**

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a)	What is the main difference in DPCM and DM?	[2]
b)	Specify the Nyquist rate and the Nyquist interval for each of the following signals: i) sinc(200t) (ii) $sinc^2(200t)$.	[3]
c)	Show that the entropy is maximum when all the symbols are equi probable. Assume M=2.	[2]
d)	Discuss the difference between convolution code and block code.	[3]
e)	What is optimum filter and matched filter?	[2]
f)	Discuss in brief about Digital subscriber Lines.	[3]
g)	What is the major advantage of coherent PSK over coherent ASK?	[2]
h)	Compare 8-PSK and 16 PSK digital modulation techniques.	[3]
i)	List out the various applications of spread spectrum communication.	[2]
j)	How spread spectrum methods are classified and what is the basis of classification?	[3]

PART – B

(50 Marks)

2.a)	Explain the DPCM system with neat diagram.	
b)	Discuss quantization error. How does it depend upon the step size? Suggest some methods to overcome the difficulties encountered depending on the modulating Amplitude swing.	[5+5]

OR

3.a)	Discuss the different types of sampling techniques.	
b)	Discuss the slope overload distortion and granular noise present in DM.	[5+5]
4.a)	Explain about Error detection and Correction capabilities of Hamming codes.	
b)	For a linear block code, prove that the syndrome depends only on Error pattern and not on transmitted codeword.	[5+5]

OR

5.	The source of information A generates the symbols {A1,A2,A3,A4,A5,A6} with the corresponding probabilities {0.2,0.3,0.11, 0.16,0.18,0.05}. Explain the code for source symbols using Huffman and Shannon-fano encoder and compare their efficiencies.	[10]

6.a) Describe the principle of signal reception using a correlator type receiver.
b) Explain how eye pattern illustrates the performance of data transmission system with respect to Inter Symbol Interference with neat sketch. [5+5]

OR

7.a) Briefly describe about Adaptive equalization.
b) Interpret the pulse shaping method to minimize ISI. [6+4]

8.a) Sketch with a neat diagram of M-array PSK transmitter and explain.
b) Explain the FSK Detection using PLL. [6+4]

OR

9.a) With neat diagrams, explain the generation of Differentially encoded Phase Shift Keying (DPSK).
b) Draw and explain the QPSK Receiver with the help of block diagram. [5+5]

10. Draw the block diagram of simple PN sequence generator using shift register and obtain the output sequence. For this output sequence verify the properties of the PN sequence. [10]

OR

11.a) What is meant by Synchronization? Why we require synchronization in spread spectrum? Explain.
b) Explain the direct sequence spread spectrum. [5+5]

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